

The effect of 5S-Continuous Quality Improvement-Total Quality Management approach on staff motivation, patients' waiting time and patient satisfaction with services at hospitals in Uganda

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Abstract

This study aimed at analyzing the effect of 5S practice on staff motivation, patients' waiting time and patient satisfaction with health services at hospitals in Uganda. Double-difference estimates were measured for 13 Regional Referral Hospitals and eight General Hospitals implementing 5S practice separately. The study for Regional Referral Hospitals revealed 5S practice had the effect on staff motivation in terms of commitment to work in the current hospital and waiting time in the dispensary in 10 hospitals implementing 5S, but significant difference was not identified on patient satisfaction. The study for General Hospitals indicated the effect of 5S practice on patient satisfaction as well as waiting time, but staff motivation in two hospitals did not improve. 5S practice enables the hospitals to improve the quality of services in terms of staff motivation, waiting time and patient satisfaction and it takes at least four years in Uganda. The fourth year since the commencement of 5S can be a threshold to move forward to the next step, Continuous Quality Improvement.

Introduction

Quality of health care services is a key element of the right to health, and has been a major concern for many years in the context of universal health coverage.¹ In Uganda, the provision of quality health care is one the top priorities at policy and program level. The Second National Health Policy states the mission of Ministry of Health (MOH) is to enhance socio-economic development through the provision of the highest possible level of health services to all people in Uganda,² while acceleration of

quality and safety improvement is an objective of the Health Sector Strategic and Investment Plan 2010/11-2014/15 (HSSIP).³

MOH also launched the Health Sector Quality Improvement Framework and Strategic Plan 2010/11-2014/15 (QIF&SP) to provide a common framework for all stakeholders involved in quality improvement of health services including health development partners outside Uganda. Today there are various types of intervention to quality improvement of services, but MOH recommends health facilities to start 5S, an initial component of 5S-CQI (or KAIZEN)-TQM approach for improvement of the work environment, as the entry point of all quality improvement interventions.^{4,5} It is an approach to ensuring quality of goods and services initially developed by Japanese manufacturers, and started to be applied to health services in Uganda since 2007 with support of Japanese government. 5S is a sequence of activities of sort, set, shine, standardize and sustain to improvement of the work environment, CQI (continuous quality improvement) or KAIZEN is a step following 5S to continuously improve the business operation processes through repetition of the cycle of Plan-Do-Check-Act, and TQM (total quality management) is to implement systematic operation that enables to provide goods and services satisfactory for both consumers and employees.^{5,6}

According to a proposed logic tree of 5S-CQI (or KAIZEN)-TQM for hospitals in Africa, the approach enables the hospitals to reduce waste of goods, facilities and time for searching and clean work place as well as to raise awareness of staff, followed by improvement of job quality and efficiency, management of medicines and equipment, infection prevention and control and elimination of medical accidents through strengthening of organizational capacity including staff satisfaction. Subsequently the hospitals can improve their management indicated by cost reduction and increase in patient satisfaction (see Figure 1 of JICA, 2013).⁷

Since launching of 5S-CQI-TQM approach in Uganda, it was practiced in a Regional Referral Hospital (RRH) and 8 General Hospitals (GHs) at eastern and central regions by 2010. Subsequently, MOH implemented a project in 2011-2014 to expose nine more RRHs to the approach in early 2012 and to support two out of eight GHs practicing 5S. In line with a logic model of 5S-CQI (or KAIZEN)-TQM approach in hospitals in Africa,⁷ the project pursued improvement of patient satisfaction with services as well as reduction of waiting time of patients (as a phenomenon of improvement of job efficiency) through higher staff motivation as a result of 5S. MOH also recognizes patient (or client) satisfaction, waiting time and staff motivation (or attitude to work) as quality assessment indicators in QIF&SP.⁴ The project trained facilitators of 5S in 10 RRHs and two

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Key words: Quality improvement; 5S; Uganda.

Acknowledgements: Special thanks go to the Ministry of Health of the Republic of Uganda and Japan International Cooperation Agency for their support of the surveys in 2012-14. Deep gratitude is also expressed to numerators and field supervisors headed by Dr. Jessica S Jitta, Child Health and Development Centre of Makerere University, Kampala, Uganda, for dedication to data collection and its quality assurance.

Contributions: NT, study design, data analysis and initial draft writing and manuscript revision; SB, study conceptualization and comments on the manuscript from Ugandan perspectives of quality improvement in the health sector; TH, project management and comments on the manuscript from the field of 5S practice; TY, study conceptualization and comments on the manuscript from the global perspectives of quality improvement.

Conflict of interest: all authors worked in the Project on Improvement of Health Service through Health Infrastructure Management. There are no other conflicts of interests in the production of this paper.

Funding: this work was a part of activities in the technical cooperation project entitled The Project on Improvement of Health Service through Health Infrastructure Management supported by Japan International Cooperation Agency in 2011-2014.

Received for publication: 6 July 2015.
Accepted for publication: 9 March 2016.

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Journal of Public Health in Africa 2015; 6:486
doi:10.4081/jphia.2015.486

GHs and regularly supervised and evaluated their performance. It also developed guidelines and a handbook for 5S for their references.

Meanwhile, it is not yet clearly captured what effect is actually realized as a consequence of 5S practice in Uganda and when the effect is emerged as it is a new approach to quality improvement of health services in spite of expected outcomes of routine work at health facilities listed in 5S implementation guidelines.⁵

The stakeholders being involved in quality improvement in Uganda are now more interested in the outcomes of their intervention. Some literatures were published regarding a cross-sectional study on patient satisfaction with outpatient services and a qualitative study on factors affecting implementation of hospital standards.^{8,9} Presentations on the topics such as saving of time spent for services and costs and reduction of clients' waiting time appeared at occasions like the National Quality Improvement Conference annually hosted by MOH.¹⁰⁻¹³ The Annual Health Sector Performance Report 2012/13 also summarized the results of studies on client and provider satisfaction, core indicators of HSSIP conducted by various stakeholders in the last two years.¹⁴⁻¹⁸

MOH needs to know the effectiveness of 5S since it is recognized as a fundamental to all the interventions on quality improvement.

Materials and Methods

Setting and analysis design

This study was to do a time-series analysis to know the effect of 5S practice on staff motivation, patients' waiting time and patient satisfaction with health services in 10 RRHs and two GHs intervened by the project. The analysis was done for RRH and GH separately, considering the difference of hospital scale between 400-bed RRH and GH with 100-200 beds. These 10 RRHs out of all 13 in Uganda were designated as an intervention group, while three RRHs without any intervention of 5S were classified into a control group. As for GHs, the above two were at the intervention and the rest six were at the control. To know the effect of 5S practice, double-difference estimator was analyzed by application of the following regression equation based on the analytical framework used by Barham and Maluccio.¹⁹

$$MTS_{nht} = \beta_0 + \beta_1 * 2013_t + \beta_2 * 2014_t + \beta_3 * H5S_{ht} + \delta_1 * H5S * 2013_t + \delta_2 * H5S * 2014_t + \epsilon_{nht}$$

where MTS_{nht} is level of staff motivation of staff n , waiting time of patient n or level of satisfaction of patient n in hospital h in the year t ; 2013 $_t$ is 1 if the year is 2013 and zero otherwise; 2014 $_t$ is 1 if the year is 2014 and zero otherwise; and H5S is 1 if the hospital is RRH implementing 5S or GH with project intervention and zero otherwise. ϵ_{nht} is unobserved error. The parameters mainly observed were δ_1 and δ_2 , double-difference estimates of the effect of 5S practice in 2013 and 2014 respectively. Correlation of the level of staff motivation with waiting time and patient satisfaction

was also estimated to examine the project logic.

Data

Staff motivation

Following use of 10 questions to score the staff motivation on a four-point scale ranged from 1 to 4 that higher scores reflect higher motivation, they were classified into three factors: i) satisfaction with work environment; ii) dedication to work in the current hospital; and iii) willingness to provide better services. The effect of 5S on staff motivation was analyzed by these factors.

Patients' waiting time

Two types of actual waiting time of patients were measured at the hospitals: i) waiting time from registration to entry to consultation room at outpatient department (OPD); and ii) that from arrival at dispensary to reception of medicines.

Patients' satisfaction

Seven items listed below were used to score the patient satisfaction with health services on a scale mainly ranged from 1 to 5 that higher scores give higher satisfaction: i) general cleanness of the hospital building and facility; ii) staff attitudes towards patients; iii) clearness of clinicians' explanation on patients' condition and treatment; iv) patients' impression on waiting time; v) patients' impression on availability of medicine; vi) treatment obtained; and vii) general patient satisfaction.

Data collection

Trained 25 enumerators and five field supervisors led by a local consultant conducted structured interview with questionnaires with necessary modification through pilot test to collect the data on staff motivation and patient satisfaction, and measured waiting time with a checklist in February and March in 2012-2014.

Sample size

For the study with 10% error margin, the annual sample size was calculated of at least 90 patients a RRH and 80 a GH for patient satisfaction and waiting time based on the data of outpatients annually collected by MOH. In total 4028 and 2325 samples were yielded from RRHs and GHs respectively in 2012-2014 for patient satisfaction. For waiting time, 3,367 and 3263 patients were measured at OPD and dispensary in RRHs, and 2126 and 2092 were done in GHs. Concerning staff motivation, 368 and 216 were sampled from RRHs and GHs studied.

Ethics approval

The Human Research Committee at the Institute for Science of Labour approved the

study procedure before implementation of the study (ISL#13-001).

Results

Staff motivation

Regional Referral Hospital: In 2014, staff motivation improved a little from the level in 2012 at all three factors in 10 RRHs of intervention group, while the motivation in three RRHs of control group was worse than 2012 at two out of three factors of dedication to work in the current hospital and willingness to provide better services (Table 1). According to the double-difference estimates, the effect of 5S practice on the staff motivation was identified at the factor of dedication to work in the current hospital in 2013 ($P=0.034$) and 2014 ($P=0.050$). It appeared on willingness to provide better services in 2013 ($P=0.044$), but not in 2014.

General Hospital: In two GHs of intervention group, staff motivation did not improve from the level in 2012 at all three factors. It was declined in terms of satisfaction with work environment and dedication to work in the current hospital. The staff in six GHs of control group got higher motivation than in 2012 in terms of satisfaction with work environment and willingness to provide better services. The double-difference estimates did not report the significant effect of 5S practice.

Patients' waiting time

Regional Referral Hospital: Average waiting time for OPD consultation in the intervention group slightly improved from 133 minutes in 2012 to 127 minutes in 2014, while it constantly reduced from 170 minutes in 2012 to 146 minutes in 2014 in the control group (Table 2). It was better in the intervention group throughout the study period, but the double-difference estimates did not indicate the significant effect of 5S practice. At dispensary, average waiting time in the intervention group was 32 minutes in 2014, substantially improved from 48 minutes in 2012 and 80 minutes in 2013. It was better in the control group throughout the study period, but the double-difference estimates also showed the significant effect of 5S in 2014 ($P=0.010$).

General Hospital: Average waiting time for OPD consultation in the intervention group tremendously improved from 140 minutes in 2012 to 81 minutes in 2014, and it worsened from 82 minutes in 2012 to 102 minutes in 2014 in the control group. The double-difference estimates indicated the significant effect of 5S practice in 2014 ($P<0.001$). Average waiting time at dispensary of two GHs in the intervention group was 65 minutes in 2014, the

same as the level in 2012 and better than 82 minutes in 2013. It was 31 minutes, 30 minutes and 26 minutes in 2012-2014 in the control group, much better than the intervention group throughout the study period. The double-difference estimates did not report the significant effect of 5S as expected.

Patient satisfaction

Regional Referral Hospital: In general, patient satisfaction with services in 2014 was improved from 2012 for both intervention and control groups at all items except the satisfaction with treatment obtained in the control group. In 2014 the intervention group was better than the control group at all items except

clearness of clinicians' explanation on patients' condition and treatment (Table 3). However, the significant effect of 5S practice on the satisfaction was not observed from the double-difference estimates.

General Hospital: Patient satisfaction with services in 2014 was improved from 2012 for intervention group at all items except general

Table 1. Mean scores of factors on staff motivation and double-difference estimates.

Factors, years	Mean score		Double-difference estimate	
	Intervention	Control	Estimate (δ)	P-value
Regional Referral Hospital (N=368)				
Satisfaction with work environment				
2012	3.35	2.91		
2013	3.43	2.94	0.057	0.779
2014	3.41	2.97	0.003	0.989
Dedication to work in the current hospital				
2012	3.17	3.43		
2013	3.23	3.02	0.469	0.034
2014	3.26	3.08	0.444	0.050
Willingness to provide better services				
2012	3.67	3.71		
2013	3.79	3.60	0.227	0.044
2014	3.76	3.65	0.140	0.226
General Hospital (N=216)				
Satisfaction with work environment				
2012	3.33	3.48		
2013	3.54	3.40	0.287	0.200
2014	3.25	3.64	-0.234	0.306
Dedication to work in the current hospital				
2012	3.26	3.34		
2013	3.22	3.12	0.175	0.519
2014	3.16	3.31	-0.085	0.758
Willingness to provide better services				
2012	3.79	3.85		
2013	3.78	3.84	-0.009	0.932
2014	3.79	3.86	-0.018	0.868

Table 2. Average waiting time of patients and double-difference estimates.

Factors, years	Average (min)		Double-difference estimate	
	Intervention	Control	Estimate (δ)	P-value
Regional Referral Hospital				
OPD consultation (N=3367)				
2012	133	170		
2013	115	161	-9.249	0.440
2014	127	146	16.774	0.147
Dispensary (N=3263)				
2012	48	28		
2013	80	47	12.649	0.012
2014	32	25	-12.638	0.010
General Hospital				
OPD consultation (N=2126)				
2012	140	82		
2013	153	103	-7.365	0.480
2014	81	102	-79.426	0.000
Dispensary (N=2092)				
2012	65	31		
2013	82	30	17.674	0.000
2014	65	26	4.865	0.289

Table 3. Mean scores of patient satisfaction and double-difference estimates.

Items, years	Mean score		Double-difference estimate	
	Intervention	Control	Estimate (δ)	P-value
Regional Referral Hospital (N=4028)				
Cleanliness of facilities				
2012	3.68	3.56		
2013	3.95	3.66	0.162	0.024
2014	3.77	3.71	-0.067	0.343
Staff attitudes				
2012	3.60	3.37		
2013	3.71	3.64	-0.161	0.028
2014	3.79	3.64	-0.074	0.302
Clinicians' explanation				
2012	2.29	2.32		
2013	2.46	2.57	-0.072	0.347
2014	2.42	2.46	0.000	0.995
Waiting time for services				
2012	1.46	1.42		
2013	1.44	1.47	-0.063	0.163
2014	1.58	1.49	0.048	0.274
Drug availability				
2012	3.23	2.99		
2013	3.64	3.48	-0.077	0.331
2014	3.30	3.06	-0.005	0.953
Satisfaction with treatment				
2012	1.76	1.74		
2013	1.82	1.82	-0.023	0.541
2014	1.76	1.71	0.023	0.536
General satisfaction with services				
2012	3.53	3.31		
2013	3.70	3.57	-0.093	0.199
2014	3.69	3.64	-0.176	0.013
General Hospital (N=2325)				
Cleanliness of facilities				
2012	3.68	3.78		
2013	3.74	3.81	0.036	0.643
2014	3.54	3.63	0.011	0.878
Staff attitudes				
2012	3.30	3.62		
2013	3.60	3.73	0.199	0.012
2014	3.64	3.69	0.278	0.000
Clinicians' explanation				
2012	2.39	2.50		
2013	2.29	2.52	-0.119	0.214
2014	2.57	2.45	0.232	0.012
Waiting time for services				
2012	1.37	1.57		
2013	1.42	1.56	0.070	0.238
2014	1.49	1.56	0.137	0.017
Drug availability				
2012	3.28	3.50		
2013	3.59	3.68	0.130	0.128
2014	3.60	3.51	0.314	0.000
Satisfaction with treatment				
2012	1.69	1.85		
2013	1.79	1.79	0.155	0.001
2014	1.80	1.84	0.117	0.010
General satisfaction with services				
2012	3.17	3.65		
2013	3.63	3.72	0.393	0.000
2014	3.60	3.64	0.444	0.000

cleanness of the hospital building and facility, while in the control group the improvement was shown only at an item of staff attitudes towards patients. The double-difference estimates in 2014 indicated the significant effect of 5S practice on staff attitudes towards patients, patients' impression on availability of medicine and general patient satisfaction ($P < 0.001$), treatment obtained ($P = 0.010$), and clearness of clinicians' explanation on patients' condition and treatment and patients' impression on waiting time ($P = 0.012$ and $P = 0.017$ respectively). In 2013, such effect was identified only on an item of staff attitudes towards patients ($P = 0.012$).

Correlation of staff motivation with patients' waiting time and patient satisfaction

Regional Referral Hospital: Staff motivation on satisfaction with work environment was an only factor that significantly correlated with patient satisfaction at most of aspects, while no correlation was observed with patients' waiting time (Table 4).

General Hospital: Staff motivation on willingness to provide better services significantly correlated with patients' waiting time at both OPD ($P = 0.011$) and dispensary ($P = 0.008$), but there was no correlation with patient satisfaction.

Discussion

With use of staff motivation, patients' waiting time for services at OPD and dispensary and patient satisfaction with the services described as indicators for quality assessment in QIF&SP, this study was to seek the answers to the following questions: i) Does 5S practice actually improve quality of health services? ii) What effect does 5S practice actually give to the services? iii) When is the effect realized as a consequence of 5S practice? iv) Were the

logic tree illustrated in the above-mentioned figure and the project logic appropriate? It can be answered to the questions i), ii) and iii) that 5S practice enables the hospitals to improve the quality of services in terms of staff motivation, waiting time and patient satisfaction and that it takes at least four years to do it in Uganda.

The results of the study for RRHs can be summarized that the practice handed the significant effect on staff motivation in terms of dedication to work in the current hospital and waiting time at dispensary, but it could not reach the effect on patient satisfaction. Given the experience that nine out of 10 RRHs have, the two-year period that have passed since they started the practice was not enough to realize the effect on the outcome level. On the other hand, two GHs could take possession of the significant effect on patient satisfaction with various aspects of services in 2014, at least fourth year since they started 5S practice, that had not appeared in 2013. Therefore, it can be implied that the hospitals in Uganda need at least four years to realize the effect of the practice on the stage of patient satisfaction. According 5S implementation guidelines in Uganda, 5S contains a two-year period of implementation phase and another period of two to three years of maintenance phase.⁵ In other words it takes four to five years to institutionalize 5S practice in the hospitals. This assumption could be proved by two GHs that realized the effect on patient satisfaction. However, the study for GHs also revealed that the project intervention of 5S enabled the two GHs to obtain the significant effect on patient satisfaction and waiting time for OPD consultation but staff motivation was declined on the aspects of satisfaction with work environment and dedication to work in the current hospital. These results can imply that the period of four years for the intervention of *only* 5S was too long and the two GHs could not sustain the motivation. Long-term intervention of only 5S can make *sort, set and shine* be transformed

into a goal in the minds of the staff and make them forget 5S is for what. 5S is just a tool for establishment of fundamentals to improve quality of services, not a goal.⁵

The study for both RRHs and GHs provided an insight that for the hospitals in Uganda the fourth year since the commencement of 5S practice can be a threshold to realize the effect on the stage of patient satisfaction and the time to move forward to the next step, CQI (or KAIZEN). It suggested MOH to continue to support RRHs for two more years to facilitate with institutionalization of the practice and realize the effect on services, as most of them had only two-year experiences as of 2014 and they need to extend the practice to broader area of departments than GHs. Moreover, MOH needs to think of moving forward to CQI, more concrete step to improvement of services provided, at fourth year since the commencement of 5S practice. In considering the further promotion of 5S-CQI-TQM at the hospitals in Uganda, *fourth year since the commencement of 5S* may be a key word.

Results of the correlation analysis of staff motivation with waiting time and patient satisfaction suggest appropriateness of the logic tree in the figure. The study for RRHs showed significant positive correlation of satisfaction with work environment with patient satisfaction, and it can be implied that 10 RRHs in the intervention group did not realize the effect on patient satisfaction as their satisfaction with work environment was not significantly different from three RRHs in the control group. The study for GHs revealed significant correlation of willingness to provide better services with reduction of waiting time of patients. This result can lead to an insight that the reduction is attributed to the implementation of small-scale measures to actually improve job efficiency as a result of willingness to provide better services. For example, the hospitals with shorter waiting time are taking such measures as pre-packing of medicines at their dispensary.

Table 4. Correlation coefficients between staff motivation, waiting time and patient satisfaction.

Factors of staff motivation	Waiting time		Cleanness	Attitude	Explanation	Patients' satisfaction			
	OPD	Dispensary				Waiting time	Medicine availability	Treatment satisfaction	General
Regional Referral Hospital									
Satisfaction with work environment	-0.172	0.137	0.379*	0.510*	0.052	0.428**	0.412**	0.422**	0.592**
Dedication to work in the current hospital	0.162	0.079	0.096	0.091	-0.047	-0.194	-0.071	0.149	0.062
Willingness to provide better services	0.291	0.081	0.105	0.068	0.098	-0.088	0.289	0.175	0.078
General Hospital									
Satisfaction with work environment	0.012	-0.358	0.086	0.206	-0.071	0.140	0.019	0.007	0.176
Dedication to work in the current hospital	0.191	0.171	-0.082	-0.198	0.276	-0.181	-0.218	-0.245	-0.263
Willingness to provide better services	-0.508*	-0.527**	0.275	0.176	0.159	0.365	-0.070	0.103	0.312

*Significant at 5% level; ** Significant at 1% level.

Conclusions

Our findings supported effectiveness of 5S practice on quality of health services in terms of staff motivation, patients' waiting time and their satisfaction. They also provided two insights: i) it takes at least four years to improve patient satisfaction through 5S practice in Uganda, ii) the fourth year since commencement of 5S can be a threshold to move forward to CQI to maintain the staff motivation.

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